Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

6873526426

COMPUTER SCIENCE **0478/21**

Paper 2 Problem-solving and Programming **October/November 2015**

1 hour 45 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

No calculators allowed.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name in the spaces at the top of this page.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

DO NOT ATTEMPT TASKS 1, 2 AND 3 in the pre-release material; these are for information only.

You are advised to spend no more than **40 minutes** on **Section A** (Question 1).

No marks will be awarded for using brand names of software packages or hardware.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

The maximum number of marks is 50.

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Section A

You are advised to spend no longer than 40 minutes answering this section.

Here is a copy of the pre-release material.

DO NOT attempt Tasks 1, 2 and 3 now.

Use the pre-release material and your experience from attempting the tasks before the examination to answer Question 1.

Pre-release Material

Write and test a program to complete the **three** tasks.

A new born baby is kept in a cot in a hospital; the temperature of the baby is monitored every 10 minutes. The temperature of the baby is recorded in degrees Celsius to one decimal place and must be within the range 36.0°C to 37.5°C.

TASK 1

To simulate the monitoring required, write a routine that allows entry of the baby's temperature in degrees Celsius. The routine should check whether the temperature is within the acceptable range, too high or too low and output a suitable message in each case.

TASK 2

Write another routine that stores the temperatures taken over a three hour period in an array. This routine should output the highest and lowest temperatures and calculate the difference between these temperatures.

TASK 3

For a baby who has a temperature difference of more than one degree Celsius, and/or has been outside the acceptable range more than twice in the three hour period, output a suitable message giving a summary of the problem.

Your program must include appropriate prompts for the entry of data. Error messages and other outputs need to be set out clearly and understandably. All variables, constants and other identifiers must have meaningful names. Each task must be fully tested.

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1 **(a)** All variables, constants and other identifiers should have meaningful names.

(i) When you performed the tasks, you used variables.

Write suitable declarations for **two** of these.
State what you used each one for.

Variable 1 .....

Use .....

Variable 2 .....

Use .....[4]

(ii) When you performed the tasks, you may have used constants.

Write suitable declarations for **two** of these.
State what you used each one for.

Constant 1 .....

Use .....

.....

Constant 2 .....

Use .....

.....[4]

(b) Write an algorithm to complete **Task 1**, using **either** pseudocode, programming statements **or** a flowchart.

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.....[5]

(c) (i) Explain how you completed **Task 3**. You can include pseudocode or programming statements as part of your explanation. You should assume that Task 2 has been completed.

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.....[5]

(ii) Comment on the efficiency of your design for **Task 3**.

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.....[2]

Section B

2 Read this section of program code that should input 50 numbers and then output the average.

```
1   Total = 0
2   For Counter = 1 TO 50
3     INPUT Num
4     Total = Total + 1
5     Counter = Counter + 1
6     Average = Total/Counter
7   NEXT Counter
8   PRINT Average
```

There are **four** errors in this code.

Locate these errors and suggest code corrections to remove each error.

1 .....

.....

2 .....

.....

3 .....

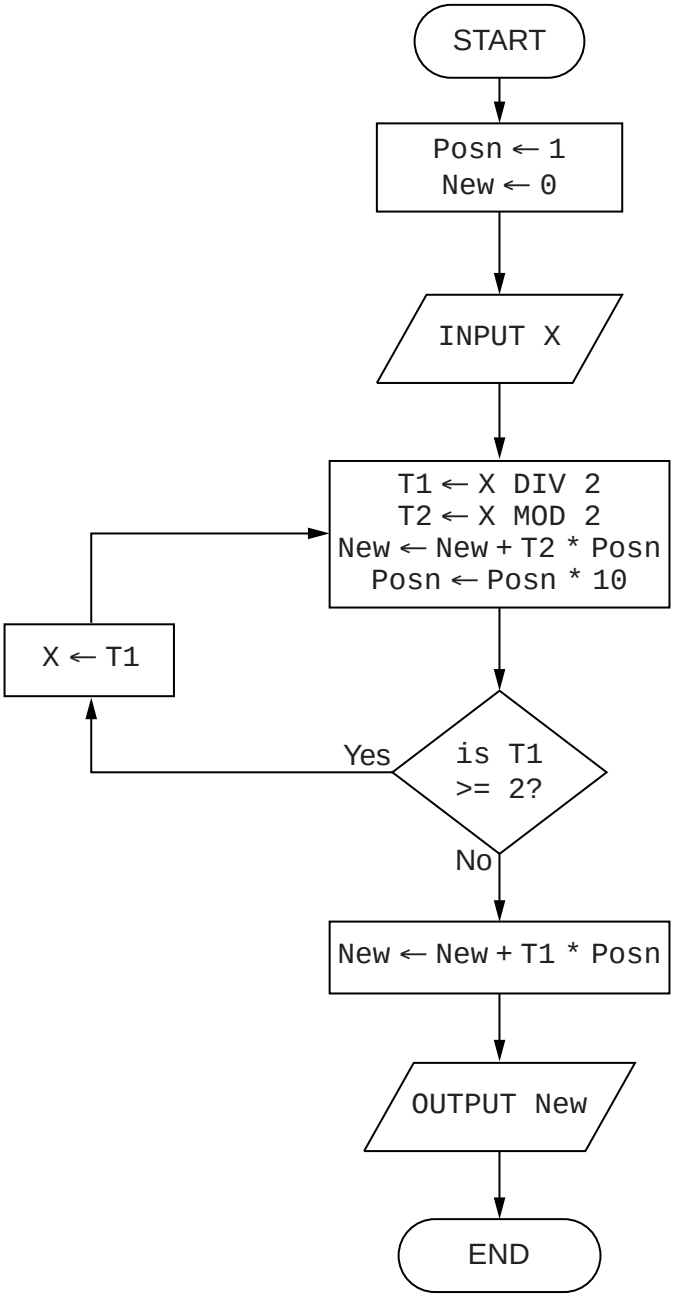
.....

4 .....

.....[4]

Question 3 begins on page 8.

3 **(a)** The flowchart inputs an integer. The predefined function `DIV` gives the integer result of the division, e.g. `Y ← 10 DIV 3` gives the value `Y = 3`. The predefined function `MOD` gives the value of the remainder, e.g. `Y ← 10 MOD 3` gives the value `Y = 1`.



Complete a trace table for each of the **two** input values 5 and 12.

Trace table for input value 5

X	Posn	New	T1	T2	OUTPUT

Trace table for input value 12

X	Posn	New	T1	T2	OUTPUT

[6]

(b) State the purpose of the flowchart in **part (a)**.

.....[1]

4 A routine checks the weight of melons to be sold in a supermarket. Melons weighing under 0.5 kilograms are rejected and melons weighing over 2 kilograms are also rejected.

Give an example of each type of test data for this routine.

Normal .....

Extreme .....

Abnormal .....[3]

5 Identify **two** different conditional statements that you can use when writing pseudocode.

1 .....

2 .....[2]

6 A picture gallery owner has decided to set up a database to keep information about the pictures he has for sale. The database table, PICTURE, will contain the following fields:

Title; Artist; Description; Catalogue Number; Size (area in square centimetres); Price; Arrived (date picture arrived at gallery); Sold (whether picture is already sold)

(a) (i) State what data type you would choose for each field.

Title .....

Artist .....

Description .....

Catalogue Number .....

Size .....

Price .....

Arrived .....

Sold .....[4]

(ii) State which field you would choose for the primary key.

.....[1]

(b) Give a validation check that you can perform on each of these fields. Each validation check must be different.

Catalogue Number .....

Size .....

Price .....

Arrived .....[4]

(c) Complete the query-by-example grid below to select and show the Catalogue Number, Title and Price of all unsold pictures by the artist 'Twister'.

Field:					
Table:					
Sort:					
Show:	☐	☐	☐	☐	☐
Criteria:					
or:					

[5]

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